INITIAL STATEMENT OF REASONS

FOR
PROPOSED BUILDING STANDARDS
OF THE
BUILDING STANDARDS COMMISSION AND
THE DIVISION OF THE STATE ARCHITECT

REGARDING
THE CALIFORNIA BUILDING CODE,
CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 2
SEISMIC RETROFIT OF STATE-OWNED BUILDINGS

The Administrative Procedure Act (APA) requires that an Initial Statement of Reasons be available to the public upon request when rulemaking action is being undertaken. The following information required by the APA pertains to this particular rulemaking action.

STATEMENT OF SPECIFIC PURPOSE AND RATIONALE

Overview

Seismic retrofit standards for state-owned buildings are currently located within Division VI-R of Chapter 16A, California Building Code, 2001 edition (Title 24, Part 2). This rulemaking action proposes to streamline and update these standards, and to relocate them into Chapter 34 (Existing Buildings) of the 2007 California Building Code. The proposed streamlining and updating of the regulations has been accomplished through replacement of prescriptive provisions with comprehensive use by reference of the Federal Emergency Management Agency's FEMA 356 *Prestandard and Commentary for the Seismic Rehabilitation of Buildings*.

This process was a collaboration between the Department of General Services (DGS), the Division of the State Architect (DSA), the California State University (CSU), the University of California (UC), the Administrative Office of the Courts (AOC), the Seismic Safety Commission (SSC), and the staff of the Building Standards Commission. The principal authors of the predecessor retrofit standards (Division III-R) and its subsequent modifications, and the CSU Seismic Review Board were included in this collaborative effort.

The express terms (proposed code change text) have been streamlined through coordination with DSA's proposed code changes to Division VI-R provisions used for public schools. *Sections 3415* through *3420* are proposed to be adopted by the BSC and DSA for application to state-owned buildings, and by DSA-SS for application to public schools. DSA-SS has proposed supplemental requirements in *Section 3421*, for application to public schools.

History and Development Process

These seismic retrofit amendments provide technical requirements for the structural modification of existing state owned buildings, including those of the University of California and the California State University. These amendments are continuations of requirements in force since the 1995 edition of the California Building Code. Incorporation of these provisions into the California Building Code for state and University of California buildings was required by SB 597 (1992) and AB 3113 (1990), which is contained in Health & Safety Code Section 16600.

The amendment does not conflict with or overlap other standards applicable to California construction.

The public interest requires these amendments if state-owned and operated buildings are to be seismically safe in the future. Without it, the prohibitive cost to obtain full compliance of existing buildings to new building standards will result in less seismic safety improvement of the existing stock of state buildings.

The amendments are evaluated as reasonable and not capricious. The amendments were developed by a committee formed from technical and administrative persons from the California State University, Division of the State Architect, California Department of General Services (Real Estate Services Division), University of California, Administrative Office of the Courts, the Seismic Safety Commission, and the Building Standards Commission staff.

By applying the seismic retrofit requirements of these amendments rather than the requirements of the model building code, the seismic design requirements for existing buildings are reduced by approximately 25%, with no significant reduction of the life-safety of the occupants should an earthquake occur, as compared to code requirements for new buildings. Many jurisdictions in the state have used this approach for many years to ensure that the joint goals of better safety for existing buildings and economy are achieved.

The same basis standard has been in effect as part of the California Building Code since 1995. Without it, there are only two choices in the level of safety for a modified existing building: a) stay the same, or b) set equal to requirements for a new building. Experience has shown that when presented with such a stark difference (particularly regarding cost), the decision to do nothing is often the choice made. The proposed amendments provide a moderating element on cost, since the design levels are somewhat lower, and more importantly, historic building practices that would not be allowed under the "new building" provisions can be used where they are safe. With adoption of this amendment, it can be anticipated that many more existing hazardous building will be retrofitted to a life-safe level than would occur if it was not adopted. It can also be expected that under these amendments, buildings that are proposed for modifications that do not impact the structural system cannot be modified unless they are shown not to be dangerous, as would be permitted under the model code provisions.

These amendments have been widely reviewed during development by technical representatives of many state agencies and by individuals in private practice. The base regulations on which they were developed have been part of the California Building code for the past 10 years. The proposed regulations are evaluated as clear and objective.

The model building code Chapter 34 prescribes some structural requirements for existing buildings. The scope of the model code and referenced standards does not address specific aspects for construction within DSA's jurisdiction. The model code and referenced standards do not fulfill statutory performance objectives for buildings within DSA's jurisdiction. The model building code is limited in content regarding structural issues for existing buildings, and has almost no discussion of seismic performance issues for existing buildings. If it is the only section of the Code to apply to existing buildings, then in almost all cases any significant modification of the seismic safety of a building will require it to conform to the requirements for a new building. With this level of conformance, it will not be possible to use archaic structural elements that are not permitted under current provisions of the model building code. There are many past construction practices that are no longer allowed by code, but which yield buildings that are expected to provide life safety performance.

The proposed amendments are a successor to Division VI-R from the 2001 edition of the CBC. The significant difference is that when Division VI-R and its predecessors were adopted, there was no national standard for the seismic regulation of existing buildings. In the past few years, the Federal Emergency Management Agency has been supporting research efforts to develop such standards. Recently the American Society of civil Engineers (ASCE) has been working on an adaptation of FEMA 356, *Guidelines for* the *Seismic Retrofit of Existing Buildings*, to become a standard ASCE-41. FEMA 356 has been in print for the past six years. While it is not a consensus standard, FEMA 356 is used by many public and private organizations in applying the existing Division VI-R requirements of the California Building Code, and can be used under Method B. OSHPD has authorized its use for their buildings with some restrictions to buildings under their jurisdiction.

ASCE representatives indicate that approval of a standard is expected within the year, possibly sooner. Based on the advanced drafts of the document, and the general success of using FEMA 356, it is proposed that the existing Division VI-R requirements for existing state buildings be revised to make FEMA 356 the basis for the provisions. This was done by a committee formed from technical and administrative persons from the California State University, Division of the State Architect, General Services Department Real Estate Services Division, University of California, Administrative Office of the Courts, Seismic Safety Commission, and the Building Standards Commission, with assistance from professional engineers throughout the state. The draft ASCE-41 standard for the final ballot has been reviewed, and the outcome evaluated if the proposed modifications are completed. When ASCE-41is adopted, it will be reviewed and possibly the references to FEMA 356 will be replaced with references to ASCE-41.

Summary of Proposed Changes:

For the cases where the necessary CBC Division VI-R requirements are essentially unchanged for the added Sections 3415 to 3520, the rationale will be stated as "relocation from the related Section of the

current 2001 CBC Division VI-R."

Need for an upgraded version of CBC Division VI-R: While the currently applicable CBC Division VI-R provides specific requirements for the evaluation and subsequent retrofit design of state owned buildings, the procedure for evaluation and design as given in the non-peer reviewed Method A requires upgrade and changes so as to provide the performance-based design procedures of FEMA 356 *Prestandard and Commentary for the Seismic Rehabilitation of Buildings*. This Prestandard allows the specification of defined performance levels, such as Life Safety or Collapse Prevention at respective hazard levels of seismic ground motions. For each performance level, there are values of acceptance criteria for the inelastic deformation response of the various structural components of an existing building. Retrofitted components must have the strength level to comply with the acceptance criteria.

One of the primary objectives of this adoption for existing buildings is to provide an integrated code applicable for all authorities (DGS, UC, CSU, DSA for Public Schools) with minimum number of exceptions for any specific authority. In the process of review of the existing code. where particular exceptions by an authority were found to be acceptable by the other authorities, then the exception notation was removed and the text of the exception was incorporated as a generally applicable requirement. The resulting integrated code will result in a more efficient design and enforcement process for all participants.

As a result of the incorporation of the FEMA 356 provisions, the following 2001 CBC Division VI-R Sections and sub-sections are proposed to be repealed:

Sections: 1641A , 1642, 1644A, 1645A, 1646A, 1647A.

Sub-sections: 1643A.8, 1643A10, 1643A11, 1648A2.1.1 to 1648A2.1.6, 1648A2.2, 1648A2.3 through 1648A2.3.7.

CHAPTER *16A* - STRUCTURAL DESIGN REQUIREMENTS

Section 1640A
The content of *Section 1640A* is proposed to be revised and relocated to *Section 3415*.

Section 1641A
The content of *Section 1641A* is proposed to be revised and relocated to *Section 3416*.

Section 1642A
The content of *Section 1642A* is proposed to be repealed. Symbols are not needed due to adoption by reference of FEMA 356 provisions for use as Method "A" (see repeal of *Section 1644A* and adoption of *Section 3418*).

Section 1643A
The content of Section *1643A* is proposed to be revised and relocated to *Section 3417*.

Section 1644A
The content of *Section 1644A* is proposed to be repealed.

Section 1645A
The content of *Section 1645A* is proposed to be repealed.

Section 1646A
The content of *Section 1646A* is proposed to be repealed.

Section 1647A
The content of *Section 1647A* is proposed to be repealed.

Section 1648A
The content of *Section 1648A* is proposed to be revised and relocated to *Section 3419*.

Section 1649A
The content of *Section 1649A* is proposed to be revised and relocated to *Section 3420*.

CHAPTER 34 - EXISTING STRUCTURES

Section 3401

3401.1.1. This amendment provides reference to Sections 3415 through 3420, for application to state-owned buildings.

Section 3403

Section 3403.2 of the 2006 International Building Code (IBC) requires that additions and alterations resulting in more that 5 percent force increase in an element and repairs of deficient elements meet requirements for new structures.

IBC Chapter 34 is not adequate to prescribe retrofit. The CBC Division VI-R presently provides the appropriate retrofit provisions. The EXCEPTION to Section 3403.2 is necessary to allow an equivalent version of CBC Division VI-R with upgrade (using FEMA 356) to provide the necessary requirements for retrofit of state owned buildings.

Reason for EXCEPTION: The triggers for applicability of the requirement for the evaluation of an existing building are not adequate, and the feasibility of meeting the requirements for new structures is often not possible for existing elements that do not comply with the details required for new structures. The EXCEPTION allows an upgraded version of CBC Division VI-R to be applicable as added Sections 3415 to 3520 where appropriate applicability triggers and practical design requirements are provided.

SECTION 3415 - EARTHQUAKE EVALUATION AND DESIGN FOR RETROFIT OF EXISTING BUILDINGS

3415.1 Purpose.
To specify the authority and building occupancies subject to the requirements of Sections 3415 to 3420.

3415.2 Scope.
Relocated from 1640A.1. The exception provides reference to the voluntary retrofit Section 3415.11.

3415.3 Applicability.
Relocated from 1640A.2

3415.4 Evaluation required.
Relocated from 1640A.2.1

3415.5 Minimum seismic design performance levels for structural and nonstructural components.
Specifies the FEMA 356 Performance Criteria in terms of seismic ground motion at a given hazard and the related performance level for each authority and occupancy category.

3415.6 Retrofit required.
Relocated from 1640A2.2

3415.7
Relocated from 1640A.3, but with reference to the IBC Chapter 16.

3415.8
Relocated from 1640A.4, but with reference to FEMA 356 Chapter 9.

3415.9
Relocated from 1640A.5

3415.10
Relocated from 1640A.6

3415.11 Voluntary lateral-force resisting system modifications.
The purpose of these provisions is to allow partial voluntary seismic upgrades, subject to the minimum requirements of Section 3417.12. These provisions are intended to encourage seismic strengthening of the

most vulnerable features of an existing building, while not requiring strengthening of all seismic load path elements and connections of buildings that otherwise are not subject to a required comprehensive retrofit.

SECTION 3416 - DEFINITIONS
Definitions are proposed to provide terms used for enforcement provisions, and for the FEMA 356 performance objectives as given in *Table 3415.5*, and related procedures. Definitions proposed to be repealed are no longer necessary with the repeal of *Section 1644A,* and replacement (by reference) of FEMA 356 provisions.

SECTION 3417 - SEISMIC CRITERIA SELECTION FOR EXISTING BUILDINGS
3417.1 Basis for Evaluation and Design.
Relocated from *1643A.1*, but with requirement for Building Official approval for Method B and replacement of FEMA 356 Standards. The **Exception** allows relatively new Buildings designed per the 1998 CBC to meet requirements of this section without evaluation.

3417.1.1 Specific procedures.
Relocated from 1643A.1.1, but with name change from “special” to “specific”.

3417.1.2
Added requirement for building official approval of peer reviewer and seismic criteria and evaluation procedures, to ensure quality and independence of peer review process.
3417.1.3
Unreinforced masonry infilled frames are common in older structures, and have been demonstrated in California earthquakes to be safe under specific conditions where they do not fail out-of-plane. This section allows the use of masonry infill for lateral load resistance according to procedures given in FEMA 356, Chapter 7. Out-of-plane stability verification is required for the prevention of falling hazard.

3417.2 Existing Conditions.
Relocated from 1643A.2. Added are the specific date collection requirements from FEMA 356 Section 2.2.

3417.3 Site Geology and Soil Characteristics
Relocated from 1643A.3 with reference to the model building code Chapter 18.

3417.4 Occupancy Categories.
Relocated from 1643A.4 with reference to model building code requirements related to occupancy.

3417.5 Configuration Requirements.
Relocated from 1643A.5 with reference to FEMA 356 definitions of irregularity.

3417.6 General Selection of Design Method.
Relocated from 1643A.6

3417.7 Prescriptive Selection of Design Method.
Relocated from 1643A.7

3417.8 Strength Requirements.
Relocated from 1643A.9 with **Exceptions** items 2. and 3. deleted

3417.9 Nonstructural Component Requirements.
Requirements are given for nonstructural components for performance level N-D or higher using FEMA 356 Chapter 11 which relates evaluation procedures to performance levels.

3417.10 Observation, Testing and Inspection.
Relocated from 1643A.12 with reference to model building code Chapter 17.

3417.11 Temporary Actions.
Relocated from 1643A.13 with reference to performance levels given in Section 3415.

3417.12 Voluntary lateral-force resisting system modifications.
Minimum requirements are given for voluntary modifications as permitted by Section 3415.11.

SECTION 3418 - METHOD A

3418.1 General.

FEMA 356 Upgrade for use of linear procedures for the performance based design as specified in Section 3415.5.

The Exception allows use of FEMA 356 Simplified Rehabilitation Method for qualifying buildings, where there is professional opinion that the simplified procedures result in safe buildings as given in the Simplified procedure.

SECTION 3419 - METHOD B

3419.1

Relocated from 1648A.1 with addition requiring Building Official approval for a waiver of consideration of seismic performance.

3419.2

Relocated from 1648A.2

3419.2.1

Relocated from 1648A2.1, addition for approval of approach by Enforcement Agency to ensure approval by the responsible authority for the building. A definite statement is added to permit Method A if acceptable. The conditions listed in 1648A2.1.1 to 1648A2.1.6 are repealed since similar items are included in FEMA 356.

3419.2.2

Relocated from 1648A.3, with changes in procedures to reflect current provisions.

FEMA 356 Chapter 2 is prescribed for code requirements unless exceptions are approved by Peer Reviewer and Building Official. This is to establish the essential concepts for evaluation and design.

3419.2.3

Relocated from 1648A.2.4, with additional approval required for seismic ground motion used in non-linear procedures.

3419.2.4

Relocated from 1648A.2.5, with addition for approval by Building Official to ensure final approval by the responsible authority for the building.

SECTION 3420 - PEER REVIEW REQUIREMENTS

3420.3.3

Relocated from 1649A3.3

Exception: to allow specific authorities to provide the peer review when qualified staff is available.

3420.3.4

Relocated from 1649A3.4, with addition to describe report items to be submitted to Building Official.

3420.4 Scope of Review

Relocated from 1649A.4 with addition to require changes during construction to be reported to reviewer.

3420.5 Reports

Relocated from 1649A.5 with requirement for report prior to submittal of plans for plan review. Building Official may waive requirement for report during a specific phase.

3420.6 Responses and Resolutions

Relocated from 1649A.6.

3420.7 Resolution of Conflicts

To assign the Enforcement Agency with authority to determine the resolution of conflicts.

TECHNICAL, THEORETICAL, AND EMPIRICAL STUDY, REPORT, OR SIMILAR DOCUMENTS

Federal Emergency Management Agency's FEMA 356 *Prestandard and Commentary for the Seismic Rehabilitation of Buildings*, dated November 2000.

CONSIDERATION OF REASONALBLE ALTERNATIVES

No reasonable alternative to these proposed regulations have been determined at this time. When the successor standard to FEMA 356 is published (ASCE 41), DSA will review its provisions and as appropriate, propose its adoption, by reference, of that nationally recognized standard. The publication of ASCE 41 is expected to occur no later than the fall of 2007.

REASONABLE ALTERNATIVES THE AGENCY HAS IDENTIFIED THAT WOULD LESSEN ANY ADVERSE IMPACT ON SMALL BUSINESS

The proposed regulations will not impose any significant adverse impact on small business.

FACTS, EVIDENCE, DOCUMENTS, TESTIMONY, OR OTHER EVIDENCE OF NO SIGNIFICANT ADVERSE IMPACT ON BUSINESS

The regulations proposed will not impose any significant adverse impact on business.

DUPLICATION OR CONFLICTS WITH FEDERAL REGULATIONS

These regulations do not duplicate Federal regulations.